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To Whom It May Concern:

This is to certify that the document entitled "International Publication No.: WO 02/17737 A1" was translated from Japanese into English by a professional translator on our staff who is skilled in the Japanese language.

The attached English translation conforms essentially with the original Japanese except for those words or phrases for which there are no English equivalents. Such words or phrases are noted in the translation along with the best English meaning.

David Munns

Subscribed and sworn to before me this 30th day of May, 2003.

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My Commission Expires
April 12, 2006

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My commission expires: April 12, 2006

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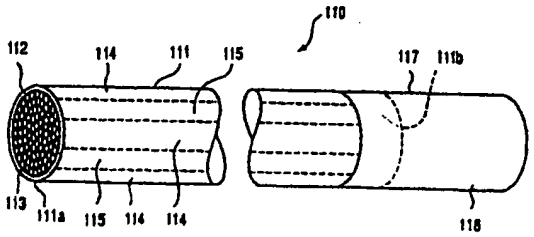
(54) LOW SPREADING SMOKING ARTICLE AND A METHOD OF MANUFACTURING THE SMOKING ARTICLE

(57) Abstract:

A smoking article is manufactured by feeding a tobacco filler to a tobacco paper being conveyed, winding the tobacco paper around the tobacco filler to prepare a rod-shaped article, and cutting to tobacco rods of a specified length. The tobacco filler contains a puffed tobacco material at a ratio of 20% by weight or more. The tobacco paper is coated with a combustion controlling agent during its conveying.



TECHNICAL FIELD

The present invention relates to a low spreading smoking article, which continues its burning at ordinary smoking state but it does not spread its burning to inflammables when it is put on inflammables, and a manufacturing method of the smoking article.

PRIOR ART

In recent years, various requests have been made of smoking articles such as cigarettes. One of those is to reduce the amount of smoke generated. Recently, it has been demanded that a smoking article should continuously burn at ordinary conditions but it should be extinguished so as not to burn inflammables when the smoking article is put on inflammables.

In Japanese Laid-Open Patent No. Hei 11[1999]-151082 was disclosed a low spreading cigarette obtained by suspending an inorganic filler such as chalk, clay or titanium oxide in a

solvent-soluble cellulose polymer dissolved in a non-aqueous solvent and coating the suspension in the form of a circular ring on a cigarette paper to form plural ring-form treated regions (combustion control regions) at a mutually separated state along the direction of the length of the cigarette rod.

In the aforementioned conventional low spreading cigarette, however, it was difficult to make coincide the pre-formed combustion control region pattern in individual cigarettes with the combustion control region pattern in individual cigarettes actually manufactured by cutting the rod-shaped body since a paper precoated with combustion control regions is introduced to a cigarette rolling-up machine, wound around a tobacco filler to obtain a long rod-shaped body and the long rod-shaped body is cut to individual cigarette. Moreover, the coating of the combustion control regions in the manufacture of the cigarette paper raises the production cost.

Thus, the objective of the present invention is to provide a smoking article with further lowered spreading property and a manufacturing method of the smoking article, wherein it is easy to make the preformed combustion control region pattern in individual cigarette coincide with the combustion control region pattern in individual cigarette actually manufactured by cutting the rod-shaped body.

DISCLOSURE OF INVENTION

According to the first view of the present invention, a low spreading smoking article is provided by feeding tobacco filler to a tobacco paper to be conveyed, winding the tobacco paper around the tobacco filler conveyed to the tobacco paper to prepare a rod-shaped article and cutting the rod-shaped article to tobacco rods of a specified length, wherein the tobacco filler contains a puffed tobacco material at a ratio of 20% by weight or more, and the tobacco paper is coated with a combustion controlling agent during its conveying.

According to the second view of the present invention, it provides a manufacturing method of a low spreading smoking article, comprising the steps of conveying a tobacco paper as the first process, coating a combustion controlling agent on the tobacco paper being conveyed as the second process, feeding a tobacco filler containing 20% by weight or more of a puffed tobacco material to the tobacco paper coated with the combustion controlling agent as the third process, winding the tobacco paper around the tobacco filler to prepare a rod-shaped article as the fourth process and cutting the rod-shaped article to tobacco rods of a specified length as the fifth process.

In a preferable method, the combustion controlling agent is coated by synchronizing with the cutting of the tobacco-shaped article.

In the present invention, the combustion controlling agent can be coated in a form of plural stripes extended along the length of the tobacco rod, a form of mutually separated plural rings extended along the circumference direction of the tobacco rod, or a form of scattered dots.

In one method, the combustion controlling agent is not coated in the region from the tip of the tobacco rod to 10-25 mm.

BRIEF EXPLANATION OF DRAWINGS

Fig. 1 is a schematic oblique view for a partially cut cigarette showing an example of cigarette relating to one method of the present invention.

Fig. 2 is a schematic oblique view for a partially cut cigarette showing an example of cigarette relating to another method of the present invention.

Fig. 3 is a schematic view for a cigarette manufacturing apparatus suitable for executing a method of manufacturing cigarettes of low spreading smoking articles according to one method of the present invention.

Fig. 4 is a scaled-up drawing showing the periphery of a combustion controlling agent stripe forming means in the cigarette manufacturing apparatus showing in Fig. 3.

Fig. 5A is a scaled-up side view for roller as the combustion controlling agent stripe forming means, a combustion controlling agent-adhered component and long web of paper being conveyed by a paper conveying means.

Fig. 5B is a front view for the roller, combustion controlling agent-adhered component and web shown in Fig. 5A.

Fig. 6A to Fig. 6D are drawings which show various examples of plural combustion controlling agent stripes formed on one side of the long web of paper being conveyed by the paper conveying means by various combustion controlling agent transfer regions of the roller using the combustion controlling agent stripe forming means shown in Fig. 4.

Fig. 6E is a oblique view for the cut-open chip paper for filter connected to a low spreading cigarette manufactured from long web of paper in Fig. 6D by the cigarette manufacturing apparatus of Fig. 3.

Fig. 7 is a scaled-up drawing for variation example of the combustion controlling agent stripe forming means of the low spreading cigarette manufacturing apparatus in Fig. 3 together with its periphery.

Fig. 8A is a scaled-up side view for the nozzle section in the variation example of the combustion controlling agent stripe forming means.

Fig. 8B is a front view for the nozzle section of Fig. 8A.

Fig. 8C is a drawing for the end surface, which is facing to the paper from the direction opposite to the side view of Fig. 8A, of the nozzle section.

Fig. 9 is a scaled-up schematic drawing for a low spreading cigarette paper inspection device in the low spreading cigarette manufacturing apparatus together with an inferior article removing means.

Fig. 10A is a plane view showing schematically the state of inspecting plural combustion controlling agent stripes, which are formed from the long web of a paper conveyed by the paper conveying means of Fig. 3 by the low spreading cigarette paper manufacturing apparatus of Fig. 3, by the low spreading cigarette paper inspection device of Fig. 9.

Fig. 10B is a drawing showing results of inspection by the low spreading cigarette paper inspection device according to Fig. 10A.

Fig. 11 is a drawing showing various inspection results by the paper inspection device of Fig. 9.

Fig. 12 is a schematic squint view for a partially cut cigarette showing an example of cigarette relating to further another method of the present invention.

Fig. 13 is a schematic oblique view for a partially cut cigarette showing an example of cigarette relating to further another method of the present invention.

Superfine method for executing the invention

Hereinafter, various methods of the present invention are explained by referring to the drawings. The same symbols are used throughout whole drawings for the same elements.

A smoking article of the present invention can be manufactured by feeding a tobacco filler to a tobacco paper being conveyed, winding the tobacco paper around the tobacco filler to prepare a rod-shaped article and cutting the rod-shaped article to tobacco rods of a specified length. A combustion controlling agent is coated on the tobacco paper during its conveying.

Fig. 1 is a schematic oblique view for a partially cut cigarette showing an example of cigarette relating to one method of the present invention.

In Fig. 1, a cigarette 110 has a tobacco rod 111 comprising a tobacco filler 113 wound in a column shape by a tobacco paper 112. The tobacco paper 112 is an ordinary tobacco paper comprising, for example, flax pulp and has an intrinsic permeability of 10-100 Coresta units. Such a tobacco rod 111 generally has a circumference length of 17 mm to 26 mm and a length of 49 mm to 90 mm. An ordinary filter 118 can be attached to the base end (namely, suction-direction downstream end) 111 b by the ordinary method using chip paper 117.

It was found that if a combustion controlling agent is coated on a tobacco paper 112 during its conveying and the tobacco filler 113 contains 20% by weight or more of puffed tobacco shredding, the combustion controlling agent is coated on the paper of individual smoking article (cigarette) after cutting in a designated manner and the combustion spreading property of the cigarette 110 to inflammables is unexpectedly further lowered as compared with the case of no puffed tobacco shredding. There is no specific restriction on the puffed tobacco shredding, but

a puffed tobacco shredding with a bulk density of 140-170 mg/cm^3 can be used. By the way, non-puffed tobacco shredding generally has a bulk density of 150 mg/cm^3 to 300 mg/cm^3. The tobacco filler 113 is packed generally at a density of about 150 mg/cm^3 to 300 mg/cm^3.

The tobacco paper 112 is coated with a combustion controlling agent during its conveying. The combustion controlling agent can be coated in a shape of, for example, plural stripes extended along the length direction of the tobacco rod. As an example, the tobacco paper 112 has 2 to 10 of stripe-shaped combustion control regions on at least one surface (generally, the inner side surface being contacted with the column-shaped tobacco filler 113). In each combustion control region 114, stripes are mutually separated in the peripheral direction of tobacco rod 111 and are continuously extended along the length direction of tobacco rod 111. Thereby, regions 115 from the paper 112 having no combustion control region as it is are provided between adjacent combustion control regions 114. The regions 115 burns at ordinary smoking state like the paper 112 itself since the regions 115 are composed of part of paper 112. Therefore, the regions 115 act as ordinary combustion regions. The thickness of the stripe-shaped combustion control regions 114 is generally 2-10 μm.

As shown in Fig. 1, each stripe-shaped combustion control region 114 can be formed from the tip of the paper 112 corresponding to the tip (namely, suction-direction upstream end) 111a of the tobacco rod 111 to near the base end 111b of the tobacco rod 111. Or, as shown in Fig. 2, the combustion control regions 114 can be formed from a position at an interval d of 10-25 mm from the tip of the tobacco rod 111 to near the base end 111b of the tobacco rod 111. The part having no combustion control regions in the tip is also composed of ordinary combustion regions, and this is suited to the region to be burned by one or two puffing of ordinary cigarettes and thus smoking taste of ordinary cigarettes at the initial smoking can be retained. In any case, it is not particularly necessary to form the combustion control regions 114 on the inner surface of the paper corresponding to the part covered with the chip paper 117 of the paper 112.

The combustion control regions 114 can be formed by coating a combustion controlling agent. As the combustion controlling agent, for example, the followings can be preferably used: namely, proteins such as gelatin, casein, albumin, gluten, etc.; polysaccharides having thickening function such as starch, xanthan gum (echo gum), locust-bean gum, guaiac gum (guarpack), tragacanth gum, tara gum, tamarind seed polysaccharide (glyloid) karaya gum, gum Arabic, pullulan, dextrin, cyclodextrin (oligoseven), ghatti, etc.; polysaccharides having gelling function such as carrageenan, cadolan, agar, gelatin, phacellulan, pectin, gellan gum, kelcogel, etc.; lipids such as lecithin, etc.; natural polymer derivatives such as carboxymethylcellulose, methylcellulose, propylene glycol alginate, processed starch (for example, starch phosphate), etc.; synthetic polymer compounds such as sodium polyacrylate, various type of synthetic polymer emulsion, etc.; inorganic ammonium salts such as ammonium chloride, ammonium

phosphate, ammonium hydrogen phosphate, ammonium dihydrogen phosphate, ammonium bromide, ammonium sulfate, etc.; inorganic hydroxides such as calcium hydroxide, aluminum hydroxide, etc.; inorganic salt flame retardant such as sodium borate, boric acid, zinc chloride, magnesium chloride, calcium chloride, sodium sulfate, etc. Those combustion controlling agents can be used singly or a mixture of two or more.

The stripe-shaped combustion control region 114 can be formed by dissolving or suspending a combustion controlling agent in a solvent such as water and transferring it onto the paper 112 using a specified roller or applying it onto the paper 112 using plural compress nozzles. Further, it can be applied using the screen printing process.

When a cigarette 110 is ignited at the tip 111a of the cigarette rod 111 and sucked, the cigarette 110 is burned by the same way as ordinary cigarette having no combustion control regions 114 since ordinary combustion regions 115 always exist along the combustion direction so that cigarette taste can be tasted, and at the same time natural burning practically continues so that its dying out is very little. Namely, in the cigarette of the present invention, the burning practically continues at ordinary smoking condition. However, when the cigarette 110 at the ignited state is put on inflammables such as carpet, tadami, wooden article, cloth, clothes, etc., the cigarette 110 is extinguished by combination of the combustion control regions 114 always existing along the combustion direction, heat absorption by the inflammables and the puffed tobacco shredding in the tobacco filler so that spreading of combustion to the inflammables is inhibited.

Based on this, the width (length in the peripheral direction of the tobacco rod 111) of the combustion control regions 114 is preferably 1 mm to 6 mm, and the interval (generally the width of combustion regions) of adjacent combustion control regions 114 is preferably 2 mm to 20 mm.

Further, the present invention also relates to a manufacturing method of a low spreading smoking article, comprising the steps of conveying a tobacco paper as the first process, coating a combustion controlling agent on the tobacco paper being conveyed as the second process, feeding a tobacco filler containing 20% by weight or more of a puffed tobacco material to the tobacco paper coated with the combustion controlling agent as the third process, winding the tobacco paper around the tobacco filler to prepare a rod-shaped article as the fourth process and cutting the rod-shaped article to tobacco rods of a specified length as the fifth process. The combustion controlling agent is coated preferably by synchronizing with cutting of the rod-shaped article.

Fig. 3 shows entire constitution of a cigarette manufacturing apparatus preferably used for the manufacture of a low spreading smoking article (cigarette) by one method of the present invention.

The constitution of the cigarette manufacturing apparatus shown in Fig. 3 is same as the constitution of conventional cigarette manufacturing apparatus except a low spreading cigarette manufacturing device 10 and a low spreading cigarette paper inspecting device 11.

The cigarette manufacturing apparatus shown in Fig. 3 has an air-permeable tobacco filler conveying means 12. The tobacco filler conveying means 12 employs an air-permeable convey belt. A tobacco filler feeding passage material 14 is extended from a tobacco filler source, which is not shown in the figure, to the tobacco filler conveying means 12. A tobacco filler containing 20% by weight or more of a puffed tobacco material is conveyed from the tobacco filler feeding source, which is not shown in the figure, by air flow to the tobacco filler conveying means 12 through the tobacco filler feeding passage material 14.

The tobacco filler from the tobacco filler feed source is pressed at the end of the tobacco filler feeding passage material 14 onto the tobacco filler conveying means 12 by air flow to form a slender strip with a specified width along the centerline of the conveying direction (length direction) of the tobacco filler conveying means 12.

The main part of a paper conveying means 18 for conveying cigarette paper from a cigarette paper feed source 16 is positioned at the end E of the conveying direction of the tobacco filler conveying means 12. In this method, a roll 20 for a long web as paper material prior to cutting to individual cigarette is arranged as a freely rotational state at the paper feed source 16, and a long web 20a taken out from the roll 20 by the aforementioned main part of the paper conveying means 18 is conveyed up to the aforementioned end through a slackening prevention means.

In this mode, the aforementioned main part of the paper conveying means 18 includes plural tension roller pairs, guide roller pairs, or driving roller pairs.

Another roll 20' like the roll 20 is arranged also as freely rotational state in the paper feeding source 16. The beginning end of web 20'b of the roll 20' is facing to the long web 20a taken out from the roll 20 by the paper conveying means 18 through an automatic patching means 22. If the end of the web 20a from the roll 20 is detected by the automatic patching means 22, the automatic patching means 22 connects the beginning end of the web 20'a from another roll 20' to the end of the web 20a of the roll 20. Then, the web 20'a of the roll 20', following the web 20a of the roll 20, is conveyed toward the end of the aforementioned main part of the paper conveying means 18 by the paper conveying means 18.

The paper conveying means 18 has an auxiliary paper conveying means 22 at the end of the aforementioned main part. In this method, the auxiliary paper conveying means 22 uses a conveying belt 22a supported by plural guide rollers and driving rollers, and the web 20a or 20'a from the end of the aforementioned main part is placed on the upper horizontal moving section of the conveying belt 22a and conveyed by the conveying belt 22a.

A scraper, which is not shown in the figure, is arranged at the end E in the conveying direction of the tobacco filler conveying means 12, and at the end E the tobacco filler is compulsorily scraped off on the web 20a or 20'a on the upper horizontal moving section of the conveying belt 22a by the aforementioned scraper. The conveying direction of the web 20a or 20'a by the upper horizontal moving section of the conveying belt 22a is same as the conveying direction of the tobacco filler by the tobacco filler conveying means 12, and the conveying-direction centerline of the tobacco filler conveying means 12 faces the conveying-direction centerline of the upper horizontal moving section of the conveying belt 22a in the top-and-bottom direction. Thereby, the tobacco filler, which is compulsorily scraped off by the aforementioned scraper from the end E in the conveying direction of the tobacco filler conveying means 12 on the web 20a or 20'a on the upper horizontal moving section of the conveying belt 22a, is deposited as a slender strip form along the conveying-direction centerline of the web 20a or 20'a on it.

A winding device 23 is arranged along the upper horizontal moving section of the conveying belt 22a. The winding device 23 winds up the web 20a or 20'a, on which the tobacco filler is deposited in a slender stripe form on the upper horizontal moving section of the conveying belt 22a, into a cigarette form (namely slender circular tube form) as the upper horizontal moving section of the conveying belt 22a advances.

The winding device 23 includes a winding-up means 24a, 24b, a paste adhering means 25, a paste drying means 26, and a cutting means 28, which are arranged along the conveying direction of the aforementioned upper horizontal moving section. The winding-up means 24a raises both side sections of the web 20a or 20'a, on which the tobacco filler is deposited in a slender strip form, to make a cross section of near U shape and bends one side section into a tube form so as to wrap the tobacco material on the slender strip-form tobacco filler. The paste adhering means 25 adheres a paste to the edge of one side of the raised web 20a or 20'a. Another raising-up means 24a adheres a paste to the other side of the paste-adhered web 20a or 20'a. As a result, the web 20a or 20'a is shaped to a rod CB of a cylindrical slender cigarette containing the tobacco filler.

The rod CB of slender cigarette is dried by passing through the paste drying means 26 and cut by the cutting means 28 to cigarettes of a specified length. Needless to say, the paper is continuously conveyed through the aforementioned process and fed to the aforementioned each process. The cutting means 28 is operated by cutting the rod CB of cigarette at the point of time when the rod CB of cigarette is sent out at a specified length.

Needless to say, the conveying direction of the long web 20a or 20'a being conveyed by the paper conveying means 18 is the longitudinal direction when the long web 20a or 20'a of the paper is wound up in the cigarette form.

The constitution in the cigarette manufacturing apparatus shown in Fig. 3 up to the stage explained above is same as the constitution of conventional cigarette manufacturing apparatus.

The low spreading cigarette paper manufacturing apparatus 10, which is a new constituent in the cigarette manufacturing apparatus shown in Fig. 3, provides with a combustion controlling agent stripe forming means 30, which is used by combination with the aforementioned main part of the paper conveying means 18.

Now, the constituent of the combustion controlling agent stripe forming means 30 is explained in detail by referring to Fig. 4 showing the periphery of the combustion controlling agent stripe forming means 30 of the cigarette manufacturing apparatus shown in Fig. 3 by expanding.

The combustion controlling agent stripe forming means 30 forms plural stripes of the combustion controlling agent extended along the longitudinal direction (in the present method, the conveying direction of the long web 20a or 20'a of paper by the paper conveying means 18) in the case when the combustion controlling agent (which was already explained) for controlling combustion spreading property of the paper of cigarette CG is wound, with respect to the surface of the side which becomes the inner surface when the web 20a or 20'a of the paper being conveyed by the main part of the paper conveying means 18 is wound to cigarette form.

The combustion controlling agent stripe forming means 30 provides with a roller 30a, which can be contacted with one side of the long web 20a or 20'a of the paper conveyed by the aforementioned main part of the paper conveying means 18 and rotates along the aforementioned conveying direction, and a combustion controlling agent adhering means 30b for feeding the combustion controlling agent to the outer circumference of the roller 30a and adhering the combustion controlling agent. A revolution force is transmitted to the roller 30a from a revolution driving means (for example, motor), which is not shown in the drawing, of the cigarette manufacturing apparatus shown in Fig. 3 by a mechanical revolution force transmission means, which is not shown in the drawing so that the roller 30a is rotated at a peripheral velocity in the rotation direction in according with the conveying velocity and conveying direction of the long web 20a or 20'b of the paper being conveyed by the paper conveying means 18 by the revolution force from the revolution driving means (for example, motor), which is not shown in the drawing.

The aforementioned one side of the long web 20a or 20'a of the paper becomes the inner surface when the long web 20a or 20'a is wound together with the tobacco filler to make a cigarette as explained above.

The combustion controlling agent adhering means 30b includes a combustion controlling agent tank 32, a control means-attached pump 34 connected to the tank 32, and a combustion controlling agent adhering part 36, which is contacted with the outer circumference of the roller

30a to adhere the combustion controlling agent from the combustion controlling agent tank 32 to the aforementioned outer circumference by the control means-attached pump 34.

The paper conveying means 18 includes a paper width-direction position controlling means 18a for controlling the relative width-direction position of the long web 20a or 20'a of the paper with respect to the outer circumference of the roller 30a in the vicinity of the roller 30a of the combustion controlling agent stripe forming means 30 and also includes a paper contact means 18b for selectively carrying out contact and separation of the long web 20a or 20'a of the paper being conveyed by the paper conveying means 18 with respect to the outer circumference of the roller 30a. The paper contact means 18b separates the web 20a or 20'a from the outer circumference of the roller 30a when the cigarette manufacturing apparatus in Fig. 3 is not operated as shown by the 2-point chain line in Fig. 4, and makes contact the web 20a or 20'a with the outer circumference when the low spreading cigarette manufacturing apparatus in Fig. 3 is operated as shown by the solid line in Fig. 4.

Next, the constitution of the roller 30a of the combustion controlling agent stripe forming means 30 is explained in detail by referring to Fig. 5A and Fig. 5B. Here Fig. 5A is a scaled-up side view for the roller 30a of the combustion controlling agent stripe forming means 30, the combustion controlling agent adhering part 36, and the long web 20a of the paper being conveyed by the paper conveying means 18, and Fig. 5B is a front view for the roller 30a, combustion controlling agent adhering part 36, and web 20a in Fig. 5A.

Plural combustion controlling agent transfer regions 38 extended to the outer circumference of the roller 30a are formed on the outer circumference of the roller 30a by corresponding to the width-direction interval of plural combustion controlling agent stripes 20b formed on the aforementioned one side of the web 20a or 20'a by extending to the conveying direction of the web 20a or 20'a by the combustion controlling agent stripe forming means 30.

The number of plural combustion controlling agent transfer regions 38, their width, and interval between them are corresponding to the number of plural combustion controlling agent stripes 20b which are formed on the aforementioned one side of the web 20a or 20'a by the combustion controlling agent stripe forming means 30, their width, and the interval between them, respectively.

The length of plural combustion controlling agent transfer regions 38 in the peripheral direction can be appropriately selected from the range of length in the peripheral direction of the outer circumference of the roller 30a.

In Fig. 6A to Fig. 6D are illustrated various examples for plural combustion controlling agent stripes formed on the aforementioned one side of the long web 20a of the paper, being conveyed by the paper conveying means 18, by various combustion controlling agent transfer regions 38 of the outer circumference of the roller 30a. In those drawings, the reference symbol

L is the length of one cigarette CG when the paper making the web 20a is wound by the winding device 23 shown in Fig. 3 to a cigarette form and cut by the cutting means 28 to cigarettes of a specific length.

Fig. 6A shows plural combustion controlling agent stripes 20b continuously formed from the beginning part to the end of long web 20a of paper along the conveying direction of the web 20a. The formation of such continuous plural combustion agent stripes 20b is accomplished by continuously forming each of plural combustion controlling agent transfer regions 38 in the aforementioned peripheral direction of the outer circumference of the roller 30a.

Fig. 6B shows plural combustion controlling agent stripes 20b formed at a certain intervals in the space between the beginning pat to the end of the 20a along the conveying direction (the longitudinal direction in the case when the paper making the web 20a is wound by the winding device 23 shown in Fig. 3 to a cigarette form) of the web 20a. And the aforementioned specified interval corresponds to the length of two of the aforementioned cigarette CG, namely 2L.

Plural combustion controlling agent stripes 20b formed at a specified interval are obtained by dividing each of plural combustion controlling agent transfer regions 38 in the aforementioned peripheral direction of the outer circumference of the roller 30a having a peripheral direction length of integral times of the length 2L for two of the aforementioned cigarette CG by the aforementioned specified interval.

The partitioning interval Y between plural combustion controlling agent stripes 20b and next plural combustion controlling agent stripes 20b in the longitudinal direction can be appropriately set.

Fig. 6C shows plural combustion controlling agent stripes 20b formed at another specified interval of 1/2 of the specified interval in Fig. 6B between the beginning part to the end of the long web 20a of the paper in the conveying direction (the length direction in the case when the paper constituting the web 20a is wound by the winding device 23 shown in Fig. 3 to a cigarette form) of the web 20a. And the aforementioned another specified interval corresponds to the length of one cigarette CG. Furthermore, the aforementioned another specified interval can be divided to an appropriate auxiliary interval.

Even in this case, the partitioning interval Y between plural combustion controlling agent stripes 20b and next plural combustion controlling agent stripes 20b in the longitudinal direction can be appropriately set.

Plural combustion controlling agent stripes 20b formed at another specified interval are obtained by partitioning each of plural combustion controlling agent transfer regions 38 in the aforementioned peripheral direction of the outer circumference of the roller 30a having a

peripheral direction length of integral times of the length L for one of the aforementioned cigarettes CG by the aforementioned another specified interval.

Plural combustion controlling agent stripes 20b formed by partitioning the aforementioned another specified interval to furthermore appropriate auxiliary interval are obtained by partitioning each of plural combustion controlling agent transfer regions 38 in the aforementioned peripheral direction of the outer circumference of the roller 30a having a peripheral direction length of integral times of the length L for one of the aforementioned cigarette CG by the aforementioned another specified interval and further partitioning the another specified interval by respective appropriate auxiliary interval.

Fig. 6D shows plural combustion controlling agent stripes 20b formed by opening another specified interval in Fig. 6C between the beginning part to the end of the long web 20a of the paper in the conveying direction (the length direction in the case when the paper constituting the web 20a is wound by the winding device 23 shown in Fig. 3 to a cigarette form) of the web 20a. Furthermore, in the aforementioned specified interval, the stripe is not formed within a specified distance X, in the length direction in the case when the paper is wound to a cigarette form, only at the end, which becomes the ignition end of the cigarette CG when the paper making the web 20a is wound by the paper winding means 26 of Fig. 3 to a cigarette form and cut by the cutting means 28 to a cigarette CG of a specified length.

The aforementioned specified distance X can be set at an appropriate value between about 10 mm and about 25 mm as mentioned above.

Further, in the aforementioned specified interval, when the paper making the web 20a is wound by the winding device 23 of Fig. 3 to cigarette form and cut by the cutting means 28 to cigarette CG of a specified length, a combustion control agent-uncoated interval of 1/2.Y occurs at the end opposite to the ignition end of cigarette CG.

In respective web 20a of Fig. 6B and Fig. 6C, the partitioning interval Y between plural combustion controlling agent stripe s 20b and next plural combustion controlling agent stripes 20b in the length direction forms a combustion controlling agent-uncoated interval of 1/2.Y at one end or both end s of cigarette CG when the paper making the web 20b is wound by the winding device 23 of Fig. 3 to cigarette form and cut by the cutting means 28 to cigarette CG of a specified length.

The aforementioned interval Y eliminates a fear of lowering the cutting break of the paper to cigarette CG after the combustion controlling agent is adhered to the cutting means 28 by touching of the cutting means 28 with the combustion controlling agent stripes 20b and is wound by the cutting means 28 to cigarette form.

Fig. 6E shows the state that the paper making the web 20a of Fig. 6D accompanied with the tobacco filler T is wound by the winding device 23 of Fig. 3 to cigarette form, cut by the

cutting means 28 to cigarette CG of a specified length, and chip paper CP accompanied with filter FL is attached to the end, opposite to the ignition end, of the cigarette CG at a combustion controlling agent-uncoated interval of 1/2.Y.

The interval having no combustion controlling agent stripes 20b of a specified distance X at the ignition end of the cigarette CG improves fire catching at the ignition end and can avoid the influence of the combustion controlling agent stripes 20b on the taste of the cigarette CG during the initial several inhales.

Plural combustion controlling agent stripes 20b, which are not formed at a specified interval X only at the end of cigarette CG, which becomes the ignition end when the paper making the web 20a is wound by the winding means 28 of Fig. 3 to cigarette form and cut by the cutting means 28 to cigarette CG of a specified length, are formed by treating each of plural combustion controlling agent transfer regions 38 on the outer circumference of the roller 30a as follows. Namely, each of plural combustion controlling agent transfer regions 38 is partitioned by the aforementioned another specified interval (namely L) in the aforementioned peripheral direction of the outer circumference of the roller 30a having a peripheral length of integral times of the length L for one of the aforementioned cigarette CG, furthermore only the end of the cigarette, which becomes the ignition end when the paper making the web 20a is wound by the winding means 26 of Fig. 3 to cigarette form and cut by the cutting means 28 to cigarette CG of the aforementioned another specified length, is extended by a specified distance X along the length direction when the aforementioned paper is wound to cigarette form to form the aforementioned plural combustion controlling agent stripes 20b.

Furthermore, according to the principle of the present invention, each of plural combustion controlling agent stripes 20b intermittently formed as shown in Fig. 6D can be further partitioned by an appropriate interval.

In the method explained above, the stripe pattern is same in the individual cigarette region on the paper web, cutting of cigarette rod is carried out each time when one cigarette region is sent out. Namely, the coating of stripe pattern can be synchronized with cutting.

Next, the constitution of the combustion controlling agent stripe forming means 30' in variation example is explained in detail by referring to Fig. 7, which shows the variation example of the combustion controlling agent stripe forming means 30 of the low spreading cigarette manufacturing apparatus in Fig. 3 and its periphery by expanding, in addition to Fig. 3.

The combustion controlling agent stripe forming means 30' in the variation example provides with a nozzle 40 contacting or approaching to one surface of long web 20a or 20'a of the paper being conveyed by the main part of the paper conveying means 18 and a combustion controlling agent feeding means 42 for feeding the combustion controlling agent to the nozzle 40.

The combustion controlling agent feeding means 42 has a compressing means 42a-attached combustion controlling agent tank 42b, a pump 42c, a control means 42d connected to the pump 42c, a synchronization means 42e connected to the control means 42d, and a combustion controlling agent conveying tube 42f for conveying the combustion controlling agent from the pump 42c to the nozzle 40.

Next, the nozzle 40 of the combustion controlling agent stripe forming means 30' is explained further in detail by referring to Fig. 8A to Fig. 8C. Here Fig. 8A is a scaled-up side view for the nozzle 40 in Fig. 7; Fig. 8B is a front view for the nozzle 40 of Fig. 8A; Fig. 8C is a section view for the paper-facing section 40a of the nozzle 40 from the direction exact opposite to the side view of Fig. 8A.

The nozzle 40 includes a cylindrical paper-facing section 40a which contacts or approaches the aforementioned one surface of long web 20a or 20'a of the paper conveyed by the aforementioned main part of the paper conveying means 18 to extend in the width direction of the web 20a or 20'a parallel to the aforementioned one surface.

On the outer circumference surface of the paper-facing section 40a are formed plural nozzle holes 40b corresponding to the width-direction interval of plural combustion controlling agent stripes 20b to be formed by extending in the conveying direction of the web 20a or 20'a on the aforementioned one surface of the web 20a or 20'a by the combustion controlling agent stripe forming means 30'.

The number, respective diameter, and mutual interval of the plural nozzle holes 40b correspond to number, respective width and mutual interval of plural combustion controlling agent stripes 20b to be formed on the aforementioned one surface of the web 20a or 20'a by the combustion controlling agent stripe forming means 30'.

The synchronizing means 42e of the combustion controlling agent feeding means 42 sends signals to the control means 42d for controlling the action of the pump 42c by the control means 42d so as to form plural combustion controlling agent stripes 20b of a desired length in the conveying direction of the web 20a or 20'a with respect to the part of long web 20a or 20'a of the paper, which is wound together with the tobacco filler to a cylinder form by winding device 23 of the cigarette manufacturing apparatus of Fig. 3 and cut to individual cigarette CB by the cutting means 28, based on the length of each cigarette manufactured by the cigarette manufacturing apparatus of Fig. 3 using long web 20a or 20'a of the paper conveyed by the main part of the paper conveying means 18.

The synchronization means 42e can use, for example, an encoder attached to a guide or supporting roller in the paper conveying means 18.

The control means 42d controls the action of the pump 42c by synchronizing the sending out distance of the web 20a or 20'a corresponding to the length of one cigarette CB in the paper

conveying means 18, which can be found by the synchronization means 42e, and, as a result, the nozzle 40 can form desired plural stripes 20b combustion controlling agent on the aforementioned one surface of corresponding web 20a or 20'a from plural nozzle holes 40b as shown in Fig. 8B.

Although it is natural, various plural combustion controlling agent stripes containing those shown in Fig. 6A to Fig. 6D can be formed on long web 20a or 20'a even when the combustion controlling agent stripe forming means 30' of the variation example is used like in the case of the combustion controlling agent stripe forming means 30' using the aforementioned roller 30a under referring to Fig. 4 and Fig. 5A to Fig. 5B.

As it is comprehended from the above explanation, since the combustion controlling agent is coated by synchronizing with cutting of cigarette rods in the present invention, the pre-designed combustion controlling agent coating pattern in each cigarette accurately agrees with the combustion controlling agent coating pattern in each cigarette actually obtained by cutting cigarette rods.

Next, a low spreading cigarette paper inspection device 11, which is a new constituent in the cigarette manufacturing apparatus shown in Fig. 3, is explained in detail by referring to Fig. 9 to Fig. 11 in addition to Fig. 3.

Furthermore, Fig. 9 is a schematic side view for the constituent of the low spreading cigarette paper inspection device 11; Fig. 10A is a schematic plane view for the state that the low spreading cigarette paper inspection device 11 of Fig. 9 inspects the plural combustion controlling agent stripes 20b formed by the low spreading cigarette paper manufacturing apparatus 10 of Fig. 3 from long web 20a or 20'a of the paper conveyed by the paper conveying means 18 of Fig. 3; Fig. 10B shows the inspection results obtained by the low spreading cigarette paper inspection device 11; Fig. 11 is a drawing showing various inspection results, which can be obtained by the low spreading cigarette paper inspection device 11 of Fig. 9.

As shown in Fig. 9, the low spreading cigarette paper inspecting device 11 provides with a light source 50 facing to the aforementioned one surface of long web 20a or 20'a of the paper conveyed by the paper conveying means 18 of Fig. 3, on which desired type of plural stripes 20b of the combustion controlling agent are formed by the low spreading cigarette paper manufacturing apparatus 10 of Fig. 3, and a light intensity detecting means 52 for detecting the intensity of light transmitted through the aforementioned web 20a or 20'a when light is projected from a light source 50 facing to the other surface positioned at the opposite side of the aforementioned one surface of the web 20a or 20'a.

The light source 50 is a line lighting means, which is parallel to the aforementioned one surface of the confronting web 20a or 20'a and is extended to a direction (width direction of web 20a or 20'a) perpendicular to the conveying direction of long web 20a or 20'a of the paper by the

paper conveying means 18 as shown as a one point chain line and it illuminates the aforementioned one surface of the web 20a or 20'a at a uniform intensity of illumination along the aforementioned width direction.

The light intensity detection means 52 is arranged at the other side of the web 20a or 20'a symmetrically to the light source 50 of the aforementioned one surface side, and it is a line sensor extended to a direction (width direction of web 20a or 20'a) perpendicular to the conveying direction of long web 20a or 20'a of the paper by the paper conveying means 18 as shown as one point chain line in Fig. 10A and detect the intensity of the transmitted light using CCD (Charge Coupled Device).

Furthermore, the light intensity detection means 52 may be, instead of line sensor, plural spot sensors which are arranged at the aforementioned other surface side of the web 20a or 20'a symmetrically to the light source 50 of the aforementioned one surface side and corresponds to only plural combustion controlling agent stripes 20b of the web 20a or 20'a on line extended along the width direction of the web 20a or 20'a.

The light intensity detection means 52 is connected to a signal processing means 54 for processing signals from the light intensity detection means 52, and inferior goods removing means is connected to the signal processing means 54. Furthermore, the inferior goods removing means is generally combined with a filter connecting device for connecting a filter to cigarette CG fed from the cigarette manufacturing apparatus by chip paper.

When plural combustion controlling agent stripes 20b formed on the web 20a shown in Fig. 10A are detected by the aforementioned light intensity detection means 52, the detection results are shown in Fig. 10B by the output from the line sensor of the light intensity detection means 52 in the web width direction position.

As it is clear from Fig. 10B, the light transmission intensity in the web 20a- existing range WB in the web width-direction position is weaker than that at the outside WO of the web 20a, furthermore the light transmission intensity further weakens in a small range WC, which is corresponding to plural combustion controlling agent stripes 20b within the web 20a-existing range WB.

The concentration of combustion controlling agent stripes 20b corresponding to the small range WC is found from the degree of output in the small range WC; the width of combustion controlling agent stripes 20b corresponding to the small range WC is found from the width of the small range WC; number of stripes 20b of the combustion controlling agent formed on the web 20a is found from number of small range WC within the web 20a-existing range WB; the distribution of combustion controlling agent stripes 20b in the width direction of the web 20a is found from the distribution of plural small range WC within the web 20a-exiting range WB; furthermore, the mutual distance in the width direction of combustion controlling agent stripes

20b formed on the web 20a is found from mutual width of plural small ranges WC within the web 20a-existing range WB.

The signal processing means 54 converts the output of the line sensor of the light intensity detection means 52 to two-value signal, and inspection results in various inferiorities in coating of the combustion controlling agent and paper connection place are shown in Fig. 11.

In examples for inferiority in the position, it is judged from the output of the line sensor of the light intensity detection means 52 at the web width-direction position that the position of one combustion controlling agent stripe 20b among specified number of combustion controlling agent stripes 20b ought be arranged at a specified arrangement and a specified concentration in the width direction of the web 20a is shifted.

In examples of no coating, it is judged from the output of the line sensor of the light intensity detection means 52 at the web width-direction position that the formation (coating) of one combustion controlling agent stripe 20b among specified number of combustion controlling agent stripes 20b ought be arranged at a specified arrangement and a specified concentration in the width direction of the web 20a is not carried out.

In examples of inferior width, it is judged from the output of the line sensor of the light intensity detection means 52 at the web width-direction position that the width of one combustion controlling agent stripe 20b among specified number of combustion controlling agent stripes 20b ought be arranged at a specified arrangement and a specified concentration in the width direction of the web 20a is not a specified value.

In examples for inferiority in coating amount, it is judged from the output of the line sensor of the light intensity detection means 52 at the web width-direction position that the concentration of two combustion controlling agent stripes 20b among specified number of combustion controlling agent stripes 20b ought be arranged at a specified arrangement and a specified concentration in the width direction of the web 20a is not a specified value. Here, the concentration of one stripe in the aforementioned two combustion controlling agent stripes 20b exceeds the upper limit threshold value (in the output from the aforementioned line sensor, the lower limit TD of the output range corresponding to the aforementioned specified concentration) and it is thicker than the aforementioned specified concentration range, and the concentration of the other stripe does not reach the lower limit threshold value (in the output from aforementioned line sensor, the upper limit TU of the output range corresponding to the aforementioned specified concentration), and it is thinner than the aforementioned specified concentration range.

In the inspection of paper connection place, the place, at which the end of long web 20 of one paper is connected to the beginning edge of long web 20' of another paper by an automatic patching means 22 in the paper feed source 16 in Fig. 3, is judged by the following manner. In the output from the light intensity detection means 52 at the web width-direction position, the

paper transmission output level at a part having no combustion controlling agent stripe 20b on the web 20a and the paper transmission output level in all of specified number of combustion controlling agent stripes 20b ought to be formed at a specified arrangement and a specified concentration in the width direction of the web 20a are normally detected at places having no paper connection, but those are uniformly lowered at places having paper connection.

When the signal processing means 54 detects various inferiorities in specified plural combustion controlling agent stripes 20b ought to formed on the web 20 or 20' of the paper at a specified arrangement and a specified concentration or a connection place of long web 20 and 20' of the paper based on the output from the light intensity detection means 52, timing for cutting cigarette CG obtained by winding with the place of long web 20 or 20' of the paper having aforementioned inferiority or connecting place from cigarette rod CB before cutting by the cutting means 28 in Fig. 3 can be eliminated from filter-attached normal cigarette CG by the aforementioned inferior goods removing means, which is not shown in the drawing, utilizing the same constituent as the synchronization means 42e used in the combustion controlling agent stripe forming means 30' of variation example in Fig. 7. The people in this industry may easily comprehend the above procedure.

Furthermore, needless to say, the signal processing means 54 can detect the existence of each of plural combustion controlling agent stripes 20b in the length direction (in this method, the conveying direction of the web 20 or 20' by the paper conveying means) when long web 20 or 20' of the paper is wound to cigarette form during conveying of the web 20 or 20' at a specified velocity by the paper conveying means 18 based on the output from the light intensity detection means 52.

Then, the light intensity detection means 52 can detect the length of the web having none of the aforementioned plural combustion controlling agent stripes 20b in the length direction by the time for no detection of the plural combustion controlling agent stripes 20b and the conveying velocity of the web 20 or 20' by the paper conveying means 18. In the aforementioned paper, the aforementioned plural combustion controlling agent stripes 20b are not formed at a specified interval from the ignition end of cigarette obtained from the web 20 or 20', and the specified interval can be also detected.

Furthermore, a specified numerical value for the aforementioned specified interval also can be detected, and it can be detected whether the aforementioned specified interval is set at a range of from about 10 mm to about 25 mm.

Thus far, the present invention was explained based on several concrete methods, but the present invention is not limited to those only. For example, the combustion controlling agent can be coated in a form of mutually separated plural circular rings extended to the peripheral direction of tobacco rod. Fig. 12 shows cigarette coated with the combustion controlling agent in

a form of circular rings 214. The circular rings 214 prescribe the combustion control regions, and those circular ring-shape combustion control regions 214 are formed by mutually separating. In the cigarette shown in Fig. 12, the combustion controlling agent is not coated in the region 216 with an interval of the aforementioned distance d from the cigarette tip. Ordinary combustion regions 215, wherein the combustion controlling agent is not coated, are prescribed between adjacent circular ring-shape combustion controlling regions 214.

Further, the combustion controlling agent is coated on whole surface of the stripe-shaped regions or circular ring-shaped regions in the methods shown in Fig. 1, Fig. 2 and Fig. 12, but the combustion controlling agent can be coated in scattered dot form. Fig. 13 is cigarette having the same constitution as Fig. 12, but the combustion controlling agent is coated on the circular ring-shaped regions as a form of many dots. Ordinary combustion regions 315, wherein no combustion controlling agent is coated, are prescribed between dot 314a-coated regions 314. The dot-form coating of the combustion controlling agent can be carried out even for the stripe-shaped regions 114 shown in Fig. 1 or Fig. 2.

Hereinafter, the present invention is explained by application examples, but the present invention is not limited to those.

APPLICATION EXAMPLE 1

First, coating materials containing various combustion controlling agents were prepared as follows:

(1) Potato starch powder on the market was dissolved at a concentration of about 25% by weight and heated to prepare a starch paste (coating material (A)).

(2) Carboxymethylcellulose (CMC) powder on the market was dissolved at a concentration of about 5.2% by weight to prepare a CMC paste (coating material (B)).

(3) CMC powder and ammonium dihydrogen phosphate on the market were dissolved at a concentration of about 5.2% by weight and about 2.5% by weight, respectively (coating material (C)).

(4) Sodium polyacrylate with polymerization degree of 2,700-7,800 on the market was used as a coating material (coating material (D)).

Each coating material was coated in a stripe form on a tobacco paper having basis weight 22.6 g/mm^3 and intrinsic air permeability 10 Coresta unit (CU) (called as tobacco paper A), a tobacco paper having basis weight 25.6 g/mm^3 and intrinsic air permeability 35 CU (called as tobacco paper B), or a tobacco paper having basis weight 28.4 g/mm^3 and intrinsic air permeability 80 CU (called as tobacco paper C) under running using an injector as shown in Table 1 and dried at a temperature 22°C and a relative humidity 60% for 2 days. The combustion controlling agent-coated tobacco paper was rolled so as to arrange the

stripe-shaped combustion control regions along the length direction. Three cigarettes were manufactured from each paper. Cigarettes having no combustion control region were also manufactured (Sample No. 0-1~0-3). Each cigarette had a circumference length 24.8 mm and tobacco rod length 59 mm, and the tobacco filler contained 30% by weight of puffed tobacco shredding, further the packing density was 230 mg/cm^3.

On the cigarettes thus manufactured, spontaneous burning rate (SBR) and ignitability (combustion spreading) to cloth (cotton deck No.6) were measured by the method reported by NIST. Here, the spontaneous burning rate was measured after a cigarette turned sideways. The results are shown in Table 1.

APPLICATION EXAMPLE 2

In this example, cigarettes were manufactured by changing the width and interval of the stripe-shaped combustion control regions.

Namely, stripe-shaped combustion control regions were formed on each paper by the screen printing process using an aqueous solution with a CMC concentration of 4% by weight as shown in Table 2, and six cigarettes were manufactured from each sample using each paper by the same manner as in Application Example 1.On each cigarette, the spontaneous burning rate and ignitability of cloth were measured by the same manner as in Application Example 1. The results are shown in Table 2.

APPLICATION EXAMPLE 3

Six cigarettes were manufactured from each sample by the same manner as in Application Example 1 except that tobacco paper C was used; the width, interval and number of stripe-shaped combustion control regions formed by coating with CMC at 3.1 $/m^2$ were fixed at 2.5 mm, 2.5 mm and 5, respectively; the content of puffed tobacco shredding in the tobacco filler was changed. On each cigarette, the spontaneous burning rate and ignitability of cloth (cotton deck No. 6) were measured by the same manner as in application example 1. The results are shown in Table 3.

Table 1

Sample No.	Combustion controlling	Tobacco paper		Stripe-shaped combustion control region				Measurement results	
	agent	type	permeability (CU)	stripe width (mm)	stripe interval (mm)	stripe number	coating amount (g/mm^2)	SBR (mm/min)	Ignitability to cloth
0-1	none	A	10	-	-	-	-	4.7	all three ignited cloth
0-2	none	B	35	-	-	-	-	5.6	all three ignited cloth
0-3	none	C	80	-	-	-	-	6.1	all three ignited cloth
1	starch	A	10	2.0	3.0	5	5.3-5.5	3.5-4.1	all three were extinguished when put on cloth
2	starch	B	35	2.0	3.0	5	7.5	3.5-4.4	all three were extinguished when put on cloth
3	CMC	C	80	2.5	2.5	5	3.1	4.5	all three were extinguished when put on cloth
4	CMC + NaH_2PO_4	C	80	2.0	3.0	5	0.9-3.8	2.7	all three were extinguished when put on cloth
5	sodium polyacrylate	C	80	2.5	2.5	5	19	-	all three were extinguished when put on cloth

Table 2

Sample No.	Tobacco paper		Stripe-shaped combustion control region				Measurement results	
	type	permeability (CU)	stripe width (mm)	stripe interval (mm)	stripe number	coating amount (g/mm^2)	SBR (mm/min)	Ignitability to cloth
6	A	10	1.0	4.0	5	0.74	4.3	4 of 6 cigarettes were extinguished when put on cloth
7	A	10	2.0	4.2	4	1.0	3.4	4 of 6 cigarettes were extinguished when put on cloth
8	B	35	2.0	3.0	5	1.2	4.2	3 of 6 cigarettes were extinguished when put on cloth
9	B	35	2.0	4.2	4	1.2	4.2	3 of 6 cigarettes were extinguished when put on cloth
10	B	35	3.0	3.2	4	1.2	3.8	all 6 six cigarettes were extinguished when putt on cloth
11	B	35	3.0	5.3	3	1.2	3.7	4 of 6 cigarettes were extinguished when put on cloth
12	B	35	4.0	4.3	3	1.2	3.9	3 of 6 cigarettes were extinguished when put on cloth
13	C	80	3.0	2.0	5	2.3	3.8	4 of 6 cigarettes were extinguished when put on cloth

Table 3

Sample No.	Content of puffed tobacco shredding (wt%)	Measurement results	
		SBR (mm/min)	Ignitability to cloth
14	0	4.3	not extinguished
15	19.2	4.5	3 of 6 cigarettes were extinguished when put on cloth.
16	33.9	4.7	4 of 6 cigarettes were extinguished when put on cloth.
17	48.8 or more	5.1	All 6 cigarettes were extinguished when put on cloth.

CLAIMS

1. A low-spreading smoking product, characterized by the following facts: a tobacco filling material is supplied to a conveyed tobacco wrapping paper; the tobacco filling material wrapped by the tobacco wrapping paper to obtain a rod-shaped article; the rod-shaped article is cut into a tobacco load with a prescribed length to manufacture the smoking product; the aforementioned tobacco filling material contains 20 wt% or more of a swollen tobacco material, with a combustion adjusting agent being coated on the tobacco wrapping paper during its conveyance.

2. The smoking product described in Claim 1, characterized by the fact that the combustion adjusting agent is coated in the form of multiple strips that extend along the longitudinal direction of the tobacco rod.

3. The smoking product described in Claim 1, characterized by the following facts: the tobacco wrapping paper has 2-10 strip-shaped combustion control areas with the combustion adjusting agent being coated along the longitudinal direction of the tobacco rod; the combustion control areas are separated from each other and are formed on at least one side of the tobacco wrapping paper; each combustion control area is continuously formed along the longitudinal direction of the tobacco rod; and the adjacent strip-shaped combustion control areas define the regular combustion area between them.

4. The smoking product described in Claim 1, characterized by the fact that the combustion adjusting agent is coated in the form of multiple rings that extend along the circumferential direction of the tobacco rod.

5. The smoking product described in Claim 1, characterized by the fact that the combustion adjusting agent is coated in the form of dispersed dots.

6. The smoking product described in Claim 1, characterized by the fact that the combustion adjusting agent mentioned in Claims 2 and 5 is not coated in the area that is 10-25 mm from the tip of the tobacco rod.

7. The smoking product described in Claim 1, characterized by the fact that the combustion adjusting agent is selected from gelatin, casein, albumin, gluten, and other proteins;

starch, xanthan gum (echo [transliteration] gum), locust bean gum, guaiac gum (guapack), tragacanth gum, Tara [transliteration] gum, tamarind seed polysaccharide karaya gum, gum Arabic, pullulan, dextrin, cyclodextrin (oligoseven), ghatti, and other polysaccharides having a thickening effect; carrageenan, cadolan, agar, gelatin, phacellulan, pectin, gellan gum, kelcogel, and other polysaccharides having a gelling effect; lecithin and other lipids ; carboxymethylcellulose, methylcellulose, propylene glycol alginate, processed starch (such as starch phosphate), and other natural polymer derivatives; sodium polyacrylate, various types of synthetic polymeric emulsifiers, and other synthetic polymeric compounds; ammonium chloride, ammonium phosphate, ammonium hydrogen phosphate, ammonium dihydrogen phosphate, ammonium bromide, ammonium sulfate, and other inorganic ammonium salts; barium hydroxide, calcium hydroxide, aluminum hydroxide, and other inorganic hydroxides; and sodium borate, boric acid, zinc chloride, magnesium chloride, calcium chloride, sodium sulfate, and other inorganic salt flame retardants.

8. A method for manufacturing a low-spreading smoking product, characterized by having the following steps:

first step for conveying tobacco wrapping paper;

second step, in which a combustion adjusting agent is coated on the conveyed tobacco wrapping paper;

third step, in which a tobacco filling material containing 20 wt% or more of a swollen tobacco material is supplied to the wrapping paper coated with the combustion adjusting agent;

fourth step, in which the tobacco filling material is wrapped by the wrapping paper to obtain a rod-shaped article; and

fifth step, in which the rod-shaped article is cut into a tobacco rod with a prescribed length.

9. The method described in Claim 8, characterized by the fact that the combustion adjusting agent is coated in synchronization with cutting of the tobacco [sic; rod]-shaped article.

10. The method described in Claim 8, characterized by the fact that in the second step, the combustion adjusting agent is coated in the form of multiple strips that extend along the longitudinal direction of the rod-shaped article.

11. The method described in Claim 8, characterized by the fact that in the second step, the combustion adjusting agent is coated to cross with the longitudinal direction of the rod-shaped article.

12. The method described in Claim 8, characterized by the fact that in the second step, the combustion adjusting agent is coated in the form of dispersed dots.

13. The method described in any of Claims 9-12, characterized by the fact that the combustion adjusting agent is coated except in the area at a distance of 10-25 mm from the tip of the tobacco rod when the rod-shaped article is cut into the tobacco rod.